An Analysis of Southeast Wisconsin's Secondary Technology Education Teachers' Perceptions on Aligning Technology Education Programs with Gateway Technical College's Manufacturing and Engineering Occupational Programs

by

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ABSTRACT

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ABSTRACT

There are six research objectives achieved through this study dealing with the analysis of perceptions, philosophy, and program alignment. Specifically, the objectives are:

1) Secondary technology educators perception of their role in technical college programming;
2) Identification of current perception of technology philosophy;
3) Determination of the level of emotional feeling toward 11-14 grade sequencing;
4) Measuring the level of support for Gateway Technical College by secondary technology education teachers;
5) Identification of current perceptions of program alignment;

6) Determination of any differences in individual perceptions based on demographics.

Based on an analysis of the survey responses, there are five recommendations regarding credit agreements, reporting systems, and policy.

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Introduction

Background of the Study

Shaping the professions' image is a complex societal issue that transcends throughout the evolution of technology education (Dugger, 2002). Positioning technology education in a way that society places value upon its rewards may seem like a simple problem. However, finding a way to change the image of the discipline so others view it as essential in educating the youth in schools has eluded professionals in the field for decades (Fullan, 2001). If technology education is valued, it would seem that the image would naturally be enhanced. While this may sound logical, further study will show that this problem is much more complex and diverse. There seems to be no direct correlation between perception and value when it comes to educational expectations.

It is important not to create the impression that other education professionals value technology education simply by marketing an image; the image of technology education is shaped by its past successes (Rose, Lowell C., Dugger, 2002). With a history deeply rooted in industrial education, it should not come as a surprise that the change to technology education has not changed the image in the minds of many in the profession or the public. Perhaps it is time to assess the profession as it relates to the alignment of secondary technology education curriculum and postsecondary occupational programming from a teachers' perspective.

Engineering and Technology:

Aligning technology education to better position the teaching of technology will take a dramatic new mindset. A mindset that no longer positions technology education at the center of technological literacy, but as a contributing discipline that adds value to the students knowledge and skills, a core discipline that shares the responsibility of technological literacy with mathematics, science, engineering and the humanities (Layton, 1993).

Shaping the professional image of technology education is rooted in the debate over where it appears in the educational pecking order. Technology education is often referred to as an applied science or contextual math and the relationship between math and science adds value to technology education (Newberry, 2002). Technology has been around as long as there have been people. Technology, like language, ritual, value, commerce and the arts, is an intricate part of a culture system. It both shapes and reflects the systems' values. Even with this basic and evolutional understanding of technology, the discipline has suffered from the constant struggle for recognition (Williams, 2003).

The professional image and growth of the discipline will be dependent upon a new alignment of the core value of technology education. Such an alignment would remove technology education from the center of the technological literacy model and embrace symmetry with science and engineering.

Engineering, the systematic application of scientific knowledge in developing an applying technology, has grown from a craft to become a science in itself. In today's complex technological world, science and engineering can scarcely be separated.

This new order of innovation and design has changed the way society thinks about education. Citizens must use knowledge of science and technology, together with strategies of design, to solve practical problems. This interplay between science and technology is not limited to contemporary practice. Rob Larsen and Susan Dunn comment in their book "*Design Technology-Children's Engineering*" that those concepts draw on long traditions of educational thought going back to John Locke, Jean-Jacques Rousseau, and a series of British educational American progressive educational traditions like that of John Dewey (Larsen and Dunn, 1990).

The alignment between the philosophy of engineering education and technology education are strikingly similar and in many cases, it is difficult to recognize any difference at all. Take for example the message that is inherent in the introductory statements describing the overall purpose and mission of the Triangle Coalition for Science and Technology Education (Ablott, 2006). The triangle coalition describes its mission in focusing action in three major areas: advocacy, communication, and programmatic efforts to advance science, mathematics, and technology education. The triangle coalition is comprised of more than 100 member organizations with representation from three primary sectors: business, education, and scientific and engineering societies. In this example, one might ask the question "what is the closest natural alignment between the educational disciplines identified by the coalition and the members that make up the organization?" "Is technology education assimilated with business, education, or scientific and engineering?" Of course, most people in technology education would suggest science and engineering. The perceptions of

professionals in the field of technology education concerning the alignment of technology education would be valuable to determine this assimilation.

Engineering is a broad field of study that has many disciplines and multiple levels of application. Engineering itself is the art of applying scientific and mathematical principles and experiences to design processes and systems. Engineering technology applies knowledge of mathematics and natural sciences to create new products (Wright, 1994). In comparing the two distinct fields of technology education and engineering, it seems evident that there is a natural relationship between the two disciplines.

Gateway Technical College located in Southeast Wisconsin encompassing Kenosha, Racine and Walworth counties. The total population exceeds 400,000 and includes 15 community-based high schools. Within the past 20 years, more that 10,000 high paying jobs have been lost due to a changing economy and the lack of qualified workers. Companies such as Western Publishing, Massy Ferguson and Jacobson-Textron have closed their operations leaving thousands of under skilled manufacturing workers with limited options for jobs and careers. In 2004, Gateway Technical College led two distinct efforts to solicit input from employers regarding their current and future workforce needs. The counties of Racine with one of the highest unemployment rate in Wisconsin at 6.7% and Kenosha with a changing economic need came together to assess what role Gateway could play in preparing employees with the skills necessary to rebuild a regional economy. The results of this effort were a focus on engineering, bioscience, entrepreneurship, advanced manufacturing and telecommunications.

Gateway Technical College immediately began expanding capacity to meet the needs of the changing economy. With the establishment of three-advanced technology

centers, new programs are in place in advanced manufacturing, bioscience, telecommunications and entrepreneurship. The challenge now is to expand Gateway Technical College student capacity to ensure that program outcomes are achieved and that employers have the necessary qualified employees to grow their business. This study will provide professional perspectives of secondary technology education teachers toward the alignment of secondary technology education programs with Gateway Technical College's manufacturing and engineering occupational programs.

Statement of the Problem

Since 2004, Gateway Technical College has undergone a systematic restructuring of its programs and services. A strong focus of this restructuring has been the alignment of programs and services by occupational clusters. One of the prominent career clusters at Gateway Technical College is Manufacturing and Engineering Technology. The impact of the alignment on articulation agreements with secondary high schools and more specifically secondary technology education programs related to manufacturing and engineering has not been determined.

Purpose of the Study

The purpose of the study was to establish professional opinions, uncover guiding principles, and make recommendations for Gateway Technical College administration regarding the alignment between secondary technology education programs with Gateway Technical College's Manufacturing and Engineering occupational programs.

Technology is often referred to as an object of study, often theoretically presented (Layton, 1993) rather than a set of knowledge and skills in its own right. From an ethical

perspective, depersonalizing the clients' opinion from experiences possibly as a student is important to ensuring a true perception of the discipline. Opinions gathered through this survey will influence Gateway Technical College's position toward secondary and adult career pathways, program alignment, and articulation between secondary and postsecondary manufacturing and engineering occupational programs. A web-based survey was the methodology to collect data.

Research Questions

The research questions for this study were:

1. What are the perceptions of secondary technology education teachers about their role in technical college programming?
2. To what extent do secondary technology education teachers agree with the technology education philosophy?
3. How do secondary technology education teachers feel about an 11-14 grade sequence?
4. What is the extent of technology education teachers' support of various program options at Gateway Technical College?
5. What are the perceptions of secondary technology education teachers on possible alignment with Gateway Technical College occupational programs?
6. What are the differences in perceptions based on selected demographics?

Significance of the Study

This research is significant for the following reasons:

1. The results of this research will benefit the technology education profession. Shaping the profession's image is a commitment to exemplary leadership. Influencing organizational change is about how well the profession mobilizes those within the profession to want to do the extraordinary things necessary to move the organization. It is about practices of those in leadership roles to transform values into opportunities, and risks into rewards. Leadership creates the climate in which the culture lives.
2. The information gathered will serve as a base to establish broad recommendations to organize the profession and align program and services of Gateway Technical College to support the needs of secondary technology education professionals.
3. The opinions gathered in this survey will be used to describe the future role of technological literacy and professional design for the delivery of technology education.
4. Data from this study will assist Gateway Technical College in refining their curriculum alignment with secondary technology education programs to strengthen articulation agreements and better meet the needs of students entering Gateway Technical College manufacturing and engineering programs.
5. Results of this study could assist other technology teachers and technical colleges refine course outcomes and strengthen articulation opportunities.

Assumptions of the Study

There are two assumptions of this study:

1. Technology education teachers in Southeast Wisconsin will provide honest perceptions of technology education within their district.
2. Technology education teachers in Southeast Wisconsin will provide honest perceptions of alignment with Gateway Technical College programming.

Limitations of the Study

This study has the following limitations:

1. Generalization of responses: opinions expressed by respondents cannot be generalized to secondary technology education teachers across the State of Wisconsin. Results of this research must be confined to only the technology education teachers within the Gateway Technical College District.
2. Due to the nature of this study, participants' risks seem minimal. There would be no physical, economic, or legal risk associated with this research. Minimal risk is defined by the U.S. Department of Health and Human Services (2001) as "The probability of magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examination or tests." Participants will be kept anonymous to protect from public exposure.

3. The psychological risk while minimal may result in the possibility of altered self-concept, increased anxiety or loss of confidence in other or government systems due to the nature of the subject matter and the interview. The web-based survey will be designed to be open-ended and may draw upon emotional experience that could not be perceived at the time of the survey. It is possible that past negative experiences "may re-evoke painful memories or emotional conflicts for participants both during and after the interview" (Hadjistavropoulos & Smith, 2001. p.167). In order to protect the individual against potential risks, participants should have ample opportunity to withdraw from the study at any time and for any reason. It is also important to debrief at the conclusion of the interview, sharing with the participants "appropriate reassurance and information about normal reactions" (Eyde, 2000, p.63). Rosenblatt (1999) declares that there is nothing more important to protecting the participants form psychological risks than a sensitive researcher who looks for cues of discomfort and is willing to change the direction or even end the interview if too much harm seems to be taking place.

4. The written interpretation of the participant's experience may provoke and emotional response from the participant if the resources in the vein the participant do not represent his experience believes in appropriate (Hadjistavropoulos and Smythe, 2001). In the cause of this study, the risk

will be minimized through briefing sessions for participants describing the purpose, procedure, expected outcome, and behavioral risks.

5. While this survey does not appear to have any direct social risk, it is important to recognize that there may be interchange between the participants and the researcher. For this reason, it is critical to insure individual confidentiality. The risks can be minimized through the development of a consent form in which participants will be made aware of risks and assured that their individual identity nor the relationship will not be jeopardized in any way.

Definition of Terms

The terms are defined as follows:

1. Adult Career Pathways-guidance, remediation, curricula, and other support elements required to enable career-limited adults to enter the workforce (Hull, Hinckley, 2006).
2. Articulation-process by which a high school student can earn credit from a postsecondary institution (DPI Brochure, 2005).
3. Career cluster-pathways from secondary school to two and four-year colleges, graduate school, and the workplace (Hull, Hinckley, 2007).
4. Ed.S.-Education Specialist degree (Graduate Bulletin, 2002-2004).
5. Engineering-systematic application of scientific knowledge in developing an applied technology (Bybee, 2002).
6. Graduate School-UW Stout Graduate School unit that performs the administrative functions of graduate education (Graduate Bulletin, 2002-2004).

7. Gateway Technical College-Wisconsin Technical College district including Kenosha, Racine and Walworth Counties (Gateway Technical College website, 2006)
8. Technology-knowledge, innovations, scientific discoveries, and tools that people use to expend their abilities and accomplish job functions or tasks (Dugger, 2001).
9. Technology Education-field of study including the disciplines of manufacturing, construction, transportation, and communications (Starkman, 2003).
10. Youth Options-state program that allows public high school juniors and seniors to take postsecondary courses at a UW institution or Wisconsin Technical college (DPI brochure, 2005).

Chapter II

Literature Review

The purpose of the study was to establish professional opinions, uncover guiding principles, and make recommendations for Gateway Technical College administration regarding the alignment between secondary technology education programs with Gateway Technical College's manufacturing and engineering occupational programs.

Quality has become an issue in all areas of education. A collection of student opinions creates an institution's reputation for service quality (Herman & Altman, 1998).

Therefore, it is important to understand the professional opinions of secondary technology education professionals as a primary driver for quality in programming. It is important for Gateway administration to understand the opinion of and perceptions of the secondary technology education professionals served within the district. A complete understanding of curriculum alignment will ultimately provide higher quality for curriculum development and students transferring. The literature review will provide a background and history of alignment of secondary and postsecondary curriculum important to identify current trends and impacts of the professional opinions.

Background

Barriers to the recognition of transfer credits between different types of institutions pose challenges to students and prevent institutions from measuring capacity (Spellings, 2006). The transformation of the world economy increasingly demands a more highly educated workforce with postsecondary skills and credentials (U.S. Department of Labor Monthly Review, November 2005).

Not surprisingly, the consequences of substandard preparation and poor alignment between high school and college persist in colleges. It is estimated that nationally 40% of all college students are required to take at least one remedial course (Breneman & Costrell, 1998). At Gateway Technical College, 32% of all incoming first year students take at least one remedial course, and 31% of incoming manufacturing and engineering first year students take at least one remedial course (WTCS Data, 2006). Evidence suggests that the amount of remedial preparation required by students prior to entering into manufacturing and engineering programs is important in understanding the individual perceptions or judgments of professional curriculum alignment.

Development of Perceptions

Individual attitudes are developed based on thought and perceptions. These perceptions can be measured and influenced by the attitude of the receiving college. Increased sensitivity to service, competition, and accountability can add to the perception of the teacher and improve the transfer of knowledge and program standards.

Measuring perceptions is critical to improved data analysis (Arcaro, 1995). Increased state and federal accountability is required to maintain support for public education. The strategy for the collection and use of data should be designed to recognize the complexity of higher education and have the capacity to accommodate diverse consumer preferences (Spellings, 2006).

Gateway is not unlike many two year community and technical colleges in terms of secondary and university perceptions regarding program quality. "Programs and initiatives that blend CTE with rigorous academic coursework are providing students

with increasingly advanced sets of precollege learning experiences. Community colleges must be ready to meet these students' needs and help them attain their educational and career goals" (Dare, 2007).

This study addresses the perception of quality of education and the willingness of secondary teachers to align secondary with postsecondary programming. Success in delivering a transition program will be dependent on the perception of the faculty involved in designing and aligning curriculum.

Transitions from Secondary to Postsecondary

Founded in 1908, the National Governors Association (NGA) is the collective voice of the nation's governors. In the NGA's 2006 report "Innovation America: A Compact for Postsecondary Education," accountability is identified as having a vital role in developing a framework conducive to communicate to all stakeholders and the public at large when the system meets, exceeds or falls short of its goals. The study provides a comprehensive analysis of the education community most directly impacted by the results. It is imperative that stakeholders are involved in the development of programs and are accountable for delivery of results. The study provides improvement strategies that improve the perceptions of manufacturing programs at Gateway Technical College through open communications.

The Association for Career and Technical Education on behalf of career and technical education professionals in the United States advocates for clearly focusing American high schools on the goal of preparing every student for full participation in a spectrum of college opportunities (Reinventing the American High School, 2006).

Understanding the transition problems at the national, state and local levels is dependent on the clarity and quality of the curriculum development process (Mills, 2000). As new programming recommendations are made, Gateway administration and faculty will use the study to enhance the opportunities for students to transition from diverse manufacturing secondary programs to Gateway's manufacturing program. "As educators we are involved frequently in designing, implementing, and teaching courses for somebody else's children. In such instances, it may be easier for us to be satisfied with less than the best. Often standards, quality, expectations, and results of alternative programs are not so high as those we'd want for our own children. In fact, most of us still cling to the dream our parents held – a college education for all our children." (Hull, 1992).

The United States Department of Education, Office of Vocational and Adult Education issued a position paper titled, "A Blueprint for Preparing American's Future." The need for change is clear in this report. Since 1917, the federal government has made a major investment to prepare students for the workforce. For decades, the investment paid off. During the last 30 years, the workforce has changed dramatically, demanding that all students complete high school possessing a core set of academic skills needed for postsecondary education and high wage jobs. Therefore, ensuring that students transition from secondary to post secondary becomes especially important

High schools have not changed enough to meet many of the new economic realities. Over 90% of students want to pursue college after graduation, and 67% actually enroll in college (U.S. DoE, 2003). Only one-third of high school students take a high school curriculum that prepares them for college level work. A completely new approach

is necessary to improve high school academic preparation and draws upon the strengths of community and technical colleges collaborating with high schools to create high quality career pathways. The simple and challenging vision of the Secondary and Technical Education Excellence Program is that every youth will complete high school with the academic knowledge and skills needed to make a successful transition to postsecondary education without remediation (D'Amico, 2003).

Secondary and Postsecondary Articulation

Secondary and postsecondary academic and vocational integration, like any major curricular approach, can be accomplished in a variety of ways and to varying degrees. It promotes learning in a manner which reflects the challenges faced by students when they enter the world outside of school. The way in which problems are presented, the situations students will face, and the skills needed to solve those problems closely model expected behaviors in the adult world. Students are more secure in learning as a result of being able to see the connections between school activities and their non-school lives (Westberry, 1997).

More and more young people emerge from high school ready neither for college nor for work. This predicament becomes more acute as the knowledge base continues its rapid expansion, the number of traditional jobs shrink, and new jobs demand greater sophistication and preparation (National Commission on Excellence in Education in *A Nation at Risk: The Imperative for Educational Reform,* 1983).

Aligning curriculum between secondary and postsecondary programs, provides for enhanced opportunities to articulate credit transfer. Articulated curriculum combines common core of learning and technical education (Hull, 1992). Articulated secondary

and postsecondary programs eliminate duplication, provide college credit for comparable high school courses, and provide a strong foundation for a postsecondary advanced skill programs.

The study of one example, Kenosha Unified School District's LakeView Advanced Manufacturing Technology Academy, demonstrates the strengths of program alignment. LakeView programming is not only aligned with Gateway programming, but it is also delivered by Gateway instructors. Students enrolled in technical courses at LakeView receive articulated credit. A student completing a complete sequence of LakeView courses will earn eighteen to twenty-three college credits while in high school.

Kenosha Unified School District reported that in 2006-07, LakeView students finished with the highest Wisconsin Knowledge and Concept exam scores for all Kenosha schools. This accelerated proficiency in reading, math, science and social studies, according to Scott Pierce, retired Kenosha superintendent, is directly related to the program alignment with Gateway's college courses.

Another example of program alignment exists between Kenosha Unified and Gateway in the field of automotive education. The following curriculum map shows how the alignment between Kenosha Unified and Gateway leads to advanced education and credit transfer opportunities for students.

Figure 1

Automotive Transportation Academy Technician

9th and 10th Grade courses taken at high school

Block	Freshman – 1st Quarter	Freshman – 2nd Quarter	Freshman – 3rd Quarter	Freshman – 4th Quarter
1	Communications 9		Math 9 - Options	
2	Science 9 – Options		Elective	
3	Elective		Social Studies	
4	Phy Ed/ Elective	Elective	Elective	Phy Ed/ Elective

Block	Sophomore – 1st Quarter	Sophomore – 2nd Quarter	Sophomore– 3rd Quarter	Sophomore – 4th Quarter
1	Communications 10		Math 10 - Options	
2	Science 10 – Options		World History	
3	**Auto Tech 1** Course #870310		Elective	Consumer Auto and Car Care
4	Physical Education	Health	Health	Physical Education

Block	Junior – 1st Qnarter	Jnnior – 2nd Quarter	Junior – 3rd Quarter	Junior – 4th Quarter
1	Science 11 – Options		Social Studies - Options	U.S. Government & Politics
2	Phy Ed/ Elective	Elective	Elective	Phy Ed/ Elective
3	Elective		College Technical Math 1A T,Th , 9 weeks, 3 Cr 804-113	College Technical Math 1B 2 Cr 804-114
4	KUSD Auto Tech 2 Course#870410 (Auto Mechanic Fuudamentals & Service References) 602-148 3 credits – ARTICULATED OR TRANSCRIPTED		Auto Brakes Course #602-144 M,W,F, 12 weeks Double Block, 4 Cr, 12-3 p.m. Auto HVAC Course #602-150 M,W,F, 6 weeks, Double Block, 2Cr, 12-3pm	

Block	Senior – 1st Quarter	Senior – 2nd Quarter	Senior – 3rd Quarter	Senior – 4th Quarter
1	Humanities/Electives	Humanities/Electives	Humanities/Electives	Humanities/Electives
2	Science 12 – Options	Science 12 – Options	Social Studies – Options	Technology – Options, Youth Apprenticeship Youth Options, KUSD Offerings
3	Written Communications I T, Th, 9 weeks, 3 Cr 801-195	Technical Reporting T, Th, 9 weeks, 3Cr 801-197	Contemporary American Society / Multicultural 3 Cr 809-197	Intro to Psyehology 3 Cr 809-198
4	Auto Steering & Suspension M,W,F, 8 weeks, Double Block, 3 Cr, 12-3pm 602-146	Auto Under Car Simulation M,W,F, 15 weeks, Double Block, 4Cr, 12-3pm 602-154		Auto Engine Performance I M,W,F, 12 weeks, Double Block, 4Cr, 12 -3pm 602-142

Taught at high school | Taught at high school | Taught at high school or GTC | Transportation Academy Courses Taught by GTC

Tech Prep

Tech Prep has a history that dates back to the early 1990's and was founded on the challenge that faced our nation. The challenge was that less than one-third of American youth will receive a baccalaureate degree and that the workforce of the world economy demanded a greater focus on technology and technical skills.

Rewarding careers also are available for technicians who complete associate degree programs in engineering, business, information technology, health, manufacturing, and certain human services areas. The education programs that prepare youth for such careers are referred to as Tech Prep/Associate Degree programs, coordinating instruction in high school with that in two-year colleges.

In the early 1990's a new vision for vocational education emerged called Tech Prep associate degree. The program targets the middle quartiles of the typical high school student body in terms of academic talent and interest. Tech Prep draws a focus on occupations requiring some education beyond high school but not necessarily a baccalaureate degree.

"Excellence in education is inevitably linked to the larger issue of human resource development in our country. If we do not know how to seek the best in all our citizens and to fully utilize our human resources, we become a wasteful society regardless of what we due elsewhere." (Parnell, 1986). Curriculum alignment through Tech Prep builds a bridge between educational systems and provides clear expectations for students making the transition from secondary to postsecondary education.

Technical Preparation, commonly referred to as Tech Prep, is a significant aspect of career and technical education and was authorized by Congress with the passage of the Carl D. Perkins Vocational Applied Technology Education Act Amendment of 1990,

which specified Tech Prep initiatives under Titles II and III of Public Law 101-392. The concept was initially discussed during an American Vocational Association (AVA) workshop symposium in 1983 (Bottom, 1994).

Dale Parnell has been credited for coining the term Tech Prep associate degree in his book, *The Neglected Majority* (1985). The Tech Prep associate degree concept according to Parnell (1985), is essentially a new approach to vocational education and is designed to integrate academic subjects (i.e., mathematics and science) with vocational-technical education subjects (i.e., engineering, applied science and mechanical subjects).

The Tech Prep concept is further described by Bragg (1995) as combining "academic and occupational oriented education, using applied academics or other approaches to curriculum integration. Tech Prep also requires formal articulation between secondary and post secondary institutions, ensuring that the last two years of high school are connected programmatically to two years of college leading to an associate degree" (p. 91). Hull (1992) noted that articulation is a process, an attitude, as well as a goal:

> "As a process, articulation is coordination of policies and practices among sectors of the education system to produce a smooth flow of students from one to another. As an attitude, it is willingness of educators in all sectors to work together to transcend the individual and institutional self-interest that impedes maximum development of the student. As a goal, it is the creation of an educational system without artificial divisions" (p. 18).

Other researchers have expressed similar thoughts abut the Tech Prep concept, including their beliefs that many students need a vocational education that is integrated with an

academic college preparatory curriculum and designed to prepare them to be successful in two-year technical education (Gray, Wang and Maliza, 1995).

The International Technology Education Association and its Technology for All Americans project developed standards for technology literacy that defines what students should know and be able to do in order to be technologically literate. Technological literacy enables people to develop knowledge and abilities about human innovation in action (ITEA 2000). Technology education as a discipline in our public schools develops content connections with other fields of study in grades K-12. Integrating disciplines of science, technology, engineering, and mathematics (STEM) prepares knowledge workers equipped to participate in the global economy (STEM Education Coalition 2007).

Tech Prep, while supporting the integrated curriculum approach of technology education and STEM, has a specific focus on aligning disciplines between secondary and postsecondary programs. Most community and technical college programs dedicated to training technicians, do not currently teach advanced skills because the students they receive are generally deficient in the basic academic skills in math, science and English (Tech Prep Resource Series 1992). This study demonstrates the need to align secondary technology education programs that integrate mathematics, science and technology with postsecondary training programs that teach technical workplace competitiveness. This integrated and alignment approach is best demonstrated at a national level by Project Lead the Way (PLTW). PLTW is a rigorous four-year program of honors level math and science, plus engineering, culminating in at least pre-calculus and advanced science classes, along with an intensive hands-on collaborative engineering project. The curriculum is produced by Project Lead the Way, Inc., a ten year old, Clifton Park, New

York, based non-profit organization dedicated to increasing the number of American college students who study and ultimately work in engineering fields.

The program delivered through technology education at the secondary level, and articulated into postsecondary advanced programs, has grown to include 2,200 schools in 49 states in 2006; 175,000 students were enrolled in PLTW courses nationwide. At Gateway, PLTW courses taken in high school are recognized for direct credit transfer through Tech Prep articulation agreements.

GATEWAY PROGRAM	***PROJECT LEAD THE WAY***
Civil Engineering	2 program credits
Electrical Engineering	4 program credits
Electronic Technician	4 program credits
Mechanical Design	4 program credits
Mechatronics	8 program credits

This study demonstrates the increased opportunity for students to transfer academic credit from high school to Gateway Technical College through a closer alignment of secondary technology education programs and Gateway Technical College's Manufacturing and Engineering occupational programs.

Summary

The culture of public education does not fully embrace change as it relates to student and credit transfer. This study has identified several barriers to change; the most relevant being the need to establish quality practices that can be embraced to assure personal satisfaction by the classroom teacher. Culture change is the natural outcome of the establishment of quality practices (Brunetti, 1993).

As the general public becomes more knowledgeable of the systems embedded in public education, their expectations become greater and more complex (Grover, 1998).

Conceptual thinking about quality is a shift in paradigm of educational attainment. The quality of public education is measured in many ways; e.g., by student achievement, graduation rates, academic test scores, and standardized tests often define success in our schools (Benson, 2000).

Quality driven organizations continue to engage in a life of perpetual change. By evaluating the professional opinions of secondary technology education teachers, the truth about perceptions of quality of programs and services, new levels of excellence can be achieved that may improve the alignment of programs in manufacturing and engineering between Gateway Technical College and the secondary schools within its district boundaries.

Chapter III

Methodology

The purpose of this research was to describe the opinions of technology education professionals in Southeast Wisconsin. Due to the ethical nature describing public opinion, a qualitative approach will be used to conduct the study. While it is important to use ethical judgment in selecting and categorizing the survey clients, this study has little ethical impact on the participants. The intent of the research is to better understand the status and make recommendations as to the future direction of the aligning secondary and postsecondary programming within the Gateway Technical College District. Complete confidentiality was built into the design as well as a process to identify, select, and conduct the survey necessary to complete this study. The design establishes a high level of quality in ensuring the Institutional Review Board (IRB) requirements. Both the participants and the readers of the published results emphasize building a level of trust and beneficence throughout the study to ensure trust. While this study has minimal risk to human participants, risks have been identified that may influence a participant's professional experience. These risks are offset by benefits that will be shared at both the beginning and the end of the survey process with each participant. Following the research, a published document reflecting the results of the study and the opinions of the research will be available to the public with the intent to shape the professional image of technology education.

The information gathered will serve as a base to establish broad recommendations to organize the profession and align services of Gateway Technical College to support the needs of secondary technology education professionals.

The survey includes five demographic questions that identify the age, gender, educational attainment, related work experience and occupational certifications. These questions provide the only demographics used in the analysis to determine if there were any correlations between them and the perceptions identified with the rest of the statements in the instrument.

The next 10 items of the instrument crossed the five dimensions included in a random order. By placing the statements in random order, respondents would not read similar dimension statements in a row, rather would be encouraged to read each statement as a unique statement.

Specific questions to be included in the study are:

1) To what extent should technology education be aligned with technical college programming?
2) To what extent would you support technology education being taught in an 11-14 grade sequence?
3) To what extent should technology education be competency-based education?
4) To what extend does technology education provide career direction?
5) To what extent do you believe you understand the opportunities for postsecondary articulation in technology education?
6) To what extent do postsecondary credits enhance high school programming?
7) To what extent are 'Youth Options' courses viable technology education courses?
8) To what extent does technology education align with manufacturing and engineering technology?
9) To what extent do articulated courses increase the recognition of technology education?

10) To what extent is teacher certification a factor in secondary and postsecondary alignment?

Demographic Survey Information

Age: 22-36

37-50

51-62

over 62

Gender:

male

female

Educational attainment:

bachelor's degree

master's degree

education specialist degree

doctorial degree

Related industry work experience:

certified work experience

voluntary work experience

no industry work experience

Occupational certification:

hold an industry certification

hold alternative certificate or license

no additional certification experience

Design Elements

This study followed the elements required by the IRB. Specific concentration was given to participant confidentiality, recruitment and selection techniques, informed consent, surveying techniques, and debriefing.

Institutional Review Board Requirements

This study was submitted to the University of Wisconsin-Stout's Institutional Review Board (IRB) for approval. The IRB had final determination if this study met the ethical obligations required by federal law and university policies.

Recruitment and Selection of Participants

The researcher through personal and professional networks recruited participants. The selection process took into consideration diversity, age, gender, and education level. The intent to select as broad of a client base as possible is to reduce generational and cultural bias. The researcher identified a pool of candidates and conducted a brief screening to ensure the candidates were interested in participating. Candidates were 9-12^{th} grade secondary school technology teachers for public school districts within the three counties making up the Gateway Technical College District. These include, Racine, Kenosha, and Walworth counties.

Informed Consent and Interview Process

A planned electronic survey lasting between five and 10 minutes was used. Due to the nature of the study, it is imperative to gather data that reflects the opinions of Southeast Wisconsin. Several methodologies were used to select, screen and inform the candidates of this research. The collected data was stored electronically to ensure accurate records. The interview began with a formal consent process consisting of a face-to-face introduction to the study and personal phone interviews explaining the purpose, risks and benefits of the study. It also allowed for the interviewer to answer questions. This personal selection and consent process was designed to establish a high level of trust and confidence between the research and the interviewee. Since the nature of this study is highly dependent on personal feelings and opinions, open and honest communications was essential to achieving the goals of the research. Following the phone conversation, providing the candidate was willing to participate in the study, an informed consent box was provided on the survey to be emailed to the candidate. The consent statement included the study background, procedures used to collect the data, risks, and benefits of the study, and a confidentiality statement. All participants were required to check the consent box in order to advance to survey. The electronic survey included a pre-developed set of questions to maintain consistency in the data collected. The researcher did not deviate from the questions as part of the analysis. The researcher documented all emailed questions regarding the survey. This record of the survey and survey results was kept secure and on file using only a pre-assigned interviewee case study number. For the sake of confidentiality, all written materials following the interview contain no identifying information that directs the responses back to the

participant. Each participant received a written copy of the final report when it is completed.

Debriefing

A voluntary debriefing session was made available for all participants following the survey response date. The researcher asked the participants if they have any additional issues or questions related to the study, would like to share any personal experiences, and reflect the important value of the study to the profession. The researcher again reviewed the confidentiality nature of the written materials collected as part of the interview. This approach was designed to build rapport and continue to build confidence with the participant. It is a researcher's responsibility to reassure the participants of the benefits of participation, check for accuracy and correct any misperceptions and manage possible harm that may have resulted as part of the interview (Eyde, 2000).

The survey was designed based on the research objectives illustrated in Appendix A.

Selection of Subjects

This study was an analysis of the perceptions of secondary technology education teachers within the Gateway Technical College District.

All subjects were Wisconsin Department of Public Instruction certified 9-12th grade secondary technology education teachers currently employed in one of the fourteen school districts located within the Gateway Technical College District borders. The qualified pool of candidates included all 73 licensed 9-12th grade secondary technology

education teachers. Of the 73 surveys issued, 37 were returned of which 4 were incomplete and did not meet the intent of the research.

Procedures

The instrument was designed to measure the perceptions of secondary technology education teachers. Subjects' names were verified by the corresponding school district to ensure accuracy. Participants' confidentiality was preserved through a formal survey method that had no identifying characteristics on the survey instrument. Since the survey was conducted electronically, additional precautions were taken to secure responses as they were received.

A total of 73 surveys were sent via electronic mail. A cover letter was attached that described the directions, purpose, confidentiality, security, and survey limitations. Participants were given two weeks to respond to the survey. The survey information was collected through SurveyMonkey with an analysis using Statistical Program for the Social Sciences (SPSS). Data for this study was collected, cut and verified by Anne Whynott, associate vice president for institutional effectiveness, Gateway Technical College, Kenosha, Wisconsin.

Chapter IV

Results and Discussion

This chapter documents major findings of the study and presents recommendations to the Gateway District in advancing the alignment of secondary technology education programs with Gateway's Manufacturing and Engineering programs. The survey was emailed to 73 secondary technology education teachers. This represents 100% of certified teachers within the Gateway Technical College District.

Survey Returns

On October 14, 2007, 73 survey instruments were sent by email to all secondary technology education teachers within the Gateway Technical College District. Of the 73 surveys emailed, 37 were returned. Four surveys were recorded as opened sites, but the survey instrument was never completed. Those four surveys had no data elements and were taken out of the data scores. After removing the four blank surveys, 33 remained, representing 45.21% return rate.

The remainder of this chapter describes the data results for each of the 36 questions included in the survey.

Survey question #1 was a statement confirming the participants consent to participating in the confidential survey. All 33 participants voluntarily consented to complete the survey.

Survey question #2 asked to what extent is technology education valued by your district. Table 1 shows that 26 or 78.7% of participants believe that technology education is valued by their district is at a level 6 or greater on a 10 point scale with 1 being not at all valued to 10 being valued to a great extent.

Table 1

Extent That Technology Education is Valued by District.

		Frequency	Percent
Valid	3	3	9.1
	4	1	3.0
	5	3	9.1
	6	4	12.1
	7	6	18.2
	8	6	18.2
	9	6	18.2
	to a great extent	4	12.1
	Total	33	100.0

Survey question #3 was left open ended for comments regarding question #2. The comments are included in Attachment F.

Survey question #4 asked to what degree does technology education support academic achievement. Table 2 shows that 29 or 87.8% of participants believe that technology education supports academic achievement is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 2

Degree to Which Technology Education Supports Academic Achievement.

		Frequency	Percent
Valid	3	1	3.0
	4	1	3.0
	5	2	6.1
	6	2	6.1
	7	4	12.1
	8	7	21.2
	9	10	30.3
	to a great extent	6	18.2
	Total	33	100.0

Survey question #5 was left open ended for comments regarding question #4. The comments are included in Attachment F.

Survey question #6 asked to what extent does technology education provide career direction. Table 3 shows that 32 or 96.9% of participants believe that technology education provides career direction is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 3

Extent to Which Technology Education Provides Career Direction.

		Frequency	Percent
Valid	3	1	3.0
	6	4	12.1
	7	5	15.2
	8	3	9.1
	9	7	21.2
	to a great extent	13	39.4
	Total	33	100.0

Survey question #7 was left open ended for comments regarding question #6. The comments are included in Attachment F.

Survey question #8 asked to what extent does technology education teach skill development. Table 4 shows that 31 or 93.9% of participants believe that technology education teaches skill development is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 4

Extent to which technology education teaches skill development.

		Frequency	Percent
Valid	3	1	3.0
	5	1	3.0
	7	2	6.1
	8	9	27.3
	9	5	15.2
	to a great extent	15	45.5
	Total	33	100.0

Survey question #9 was left open ended for comments regarding question #8. The comments are included in Attachment F.

Survey question #10 asked to what extent does technology education support problem-solving skills. Table 5 shows that 32 or 96.9% of participants believe technology education supports problem-solving skills is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 5

Extent to Which Technology Education Supports Problem-Solving Skills.

		Frequency	Percent
Valid	5	1	3.0
	6	2	6.1
	7	2	6.1
	8	3	9.1
	9	7	21.2
	to a great extent	18	54.5
	Total	33	100.0

Survey question #11 was left open ended for comments regarding question #10. The comments are included in Attachment F.

Survey question #12 asked to what extent should technology education be aligned with technical college programming. Table 6 shows that 31or 93.9% of participants believe technology education should be aligned with technical college programming is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 6

Extent to Which Technology Education Should Be Aligned with Technical College Programming.

		Frequency	Percent
Valid	3	1	3.0
	5	1	3.0
	6	4	12.1
	7	5	15.2
	8	5	15.2
	9	5	15.2
	to a great extent	12	36.4
	Total	33	100.0

Survey question #13 was left open ended for comments regarding question #12. The comments are included in Attachment F.

Survey question #14 asked to what extent would you support technology education being taught in an 11-14 grade sequence. Table 7 shows that 29 or 87.8% of participants support technology education being taught in an 11-14 grade sequence is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 7

Support for Technology Education Being Taught in an 11-14 Grade Sequence.

		Frequency	Percent
Valid	2	1	3.0
	3	1	3.0
	5	1	3.0
	6	4	12.1
	7	3	9.1
	8	7	21.2
	9	8	24.2
	to a great extent	7	21.2
	Total	32	97.0
	Missing System	1	3.0
	Total	33	100.0

Survey question #15 was left open ended for comments regarding question #14. The comments are included in Attachment F.

Survey question #16 asked to what extent should technology education be competency based education. Table 8 shows that 30 or 90.9% of participants believe technology education should be competency based is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 8

Extent to Which Technology Education Should Be Competency Based.

		Frequency	Percent
Valid	not at all	1	3.0
	5	1	3.0
	6	2	6.1
	7	3	9.1
	8	5	15.2
	9	13	39.4
	to a great extent	7	21.2
	Total	32	97.0
	Missing System	1	3.0
	Total	33	100.0

Survey question #17 was left open ended for comments regarding question #16. The comments are included in Attachment F.

Survey question #18 asked to what extent do you believe you were adequately prepared to teach technology education. Table 9 shows that 29 or 87.8% of participants believe that they were adequately prepared to teach technology education is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 9

Extent to Which Participants Believe They Were Adequately Prepared to Teach Technology Education.

		Frequency	Percent
Valid	2	1	3.0
	4	1	3.0
	5	2	6.1
	6	6	18.2
	7	6	18.2
	8	6	18.2
	9	6	18.2
	to a great extent	5	15.2
	Total	33	100.0

Survey question #19 was left open ended for comments regarding question #18. The comments are included in Attachment F.

Survey question #20 asked to what extent do you believe you understand the opportunities for post secondary articulation in technology education. Table 10 shows 29 or 87.8% of participants believe they understand the opportunities for postsecondary articulation in technology education is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 10

Extent to Which Participants Believe They Understand Post Secondary Articulation Opportunities.

		Frequency	Percent
Valid	2	1	3.0
	4	2	6.1
	5	1	3.0
	6	3	9.1
	7	11	33.3
	8	7	21.2
	9	5	15.2
	to a great extent	3	9.1
	Total	33	100.0

Survey question #21 was left open ended for comments regarding question #20. The comments are included in Attachment F.

Survey question #22 asked to what extent do post secondary credits enhance high school programming. Table 11 shows 28 or 84.8% of participants believe post secondary credits enhance high school programming is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 11

Extent to Which Participant Believes Post Secondary Credits Enhance High School Programming.

		Frequency	Percent
Valid	not at all	2	6.1
	5	2	6.1
	6	5	15.2
	7	6	18.2
	8	9	27.3
	9	4	12.1
	to a great extent	4	12.1
	Total	32	97.0
	Missing System	1	3.0
	Total	33	100.0

Survey question #23 was left open ended for comments regarding question #22. The comments are included in Attachment F.

Survey question #24 asked to what extent are "youth option" courses viable technology education courses. Table 12 shows 26 or 78.7% of participants believe youth option courses are viable technology education courses is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 12

Extent to Which Participants Believe Youth Option Courses are Viable Technology Education Courses.

		Frequency	Percent
Valid	3	1	3.0
	4	2	6.1
	5	4	12.1
	6	4	12.1
	7	6	18.2
	8	9	27.3
	9	4	12.1
	to a great extent	3	9.1
	Total	33	100.0

Survey question #25 was left open ended for comments regarding question #24. The comments are included in Attachment F.

Survey question #26 asked to what extent does technology education align with engineering technology. Table 13 shows 25 or 75.7% of participants believe technology education aligns with engineering technology is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 13

Extent to Which Participants Believe Technology Education Aligns with Engineering Technology.

		Frequency	Percent
Valid	3	2	6.1
	4	1	3.0
	5	5	15.2
	6	5	15.2
	7	9	27.3
	8	6	18.2
	9	2	6.1
	to a great extent	3	9.1
	Total	33	100.0

Survey question #27 was left open ended for comments regarding question #26. The comments are included in Attachment F.

Survey question #28 asked to what extent do articulated courses increase the recognition of technology education. Table 14 shows 29 or 87.8% of participants believe articulated courses increase the recognition of technology education is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 14

Extent to Which Participants Believe Articulated Courses Increase the Recognition of Technology Education.

		Frequency	Percent
Valid	3	3	9.1
	4	1	3.0
	5	4	12.1
	6	6	18.2
	7	8	24.2
	8	6	18.2
	9	4	12.1
	to a great extent	1	3.0
	Total	33	100.0

Survey question #29 was left open ended for comments regarding question #28. The comments are included in Attachment F.

Survey question #30 asked to what extent is teacher certification a factor in secondary and post secondary alignment. Table 15 shows 23 or 69.6% of participants believe teacher certification is a factor in secondary and post secondary alignment is at a level of 6 or greater on a 10 point scale, with 1 being not at all valued to 10 being to a great extent.

Table 15

Extent to Which Participants Believe Teacher Certification is a Factor in Secondary and Post Secondary Alignment.

		Frequency	Percent
Valid	not at all	3	9.1
	4	1	3.0
	5	6	18.2
	6	5	15.2
	7	4	12.1
	8	7	21.2
	9	4	12.1
	to a great extent	3	9.1
	Total	33	100.0

Survey question #31 was left open ended for comments regarding question #30. The comments are included in Attachment F.

Survey question #32 asked the participants' age. Table 16 shows 13 or 39.4% of participants were between the ages of 22-36; 8 or 24.2% of participants were between 37-50; 12 or 36.4% of participants fall between 51-62; and none of the participants were over 62 years of age.

Table 16

Participants' Age Demographics.

		Frequency	Percent
Valid	22-36	13	39.4
	37-50	8	24.2
	51-62	12	36.4
	Total	33	100.0

Survey question #33 asked the participants' gender. Table17 shows 30 or 90.9% of participants are male; and 3 or 9.1% of participants are female. Table 18 shows the demographics by age.

Table 17

Participants' Gender Demographics.

		Frequency	Percent
Valid	Male	30	90.9
	Female	3	9.1
	Total	33	100.0

Table 18

Participants' Gender by Age Demographics

Age	22-36	37-50	51-62	Total
Gender Male	12	6	12	30
Female	1	2	0	3
Total	13	8	12	33

Survey results reported in Table 19 demonstrate that there is a significant increase in the opinions of technology educators toward the alignment of programs with technical colleges as age and experience increase, with 62.5% in age category 37-50 and 41.2% in the 51-62 age category feeling that alignment is important to a great extent.

Table 19

Extent to Which Technical Education Should be Aligned with Technical Colleges by Age.

	Age	22-36	37-50	51-62	Total
3	Count	1	0	0	1
	% within Age	7.7%	.0%	.0%	3.0%
5	Count	7	0	0	1
	% within Age	7.7%	.0%	.0%	3.0%
6	Count	2	1	1	4
	% within Age	15.4%	12.5%	8.3%	12.1%
7	Count	1	1	3	5
	% within Age	7.7%	12.5%	25.0%	15.2%
8	Count	3	1	1	5
	% within Age	23.1%	12.5%	8.3%	15.2%
9	Count	3	0	2	5
	% within Age	23.1%	.0%	16.7%	15.2%
to a great	Count	2	5	5	12
extent	% within Age	15.4%	62.5%	41.7%	36.4%
Total	Count	13	8	12	33
	% within Age	100.0%	100.0%	100.0%	100.0%

Table 20 confirms the opinions of alignment with 11-14 grade sequencing. Age and experience in both the 37-50 age category and 51-62 age category are respectively greater than age category 22-36.

Table 20

Extent to Which Participants Support Technical Education in 11-14 Sequence by Age.

	Age	22-36	37-50	51-62	Total
2	Count	1	0	0	1
	% within Age	8.3%	.0%	.0%	3.1%
3	Count	1	0	0	1
	% within Age	8.3%	.0%	.0%	3.1%
5	Count	0	0	1	1
	% within Age	.0%	.0%	8.3%	3.1%
6	Count	1	1	2	4
	% within Age	8.3%	12.5%	16.7%	12.5%
7	Count	2	0	1	3
	% within Age	16.7%	.0%	8.3%	9.4%
8	Count	3	2	2	7
	% within Age	25.0%	25.0%	16.7%	21.9%
9	Count	3	3	2	8
	% within Age	25.0%	37.5%	16.7%	25.0%
to a great	Count	1	2	4	7
extent	% within Age	8.3%	25.0%	33.3%	21.9%
Total	Count	12	8	12	32
	% within Age	100.0%	100.0%	100.0%	100.0%

Survey question #34 asked the participants' highest level of education attainment. Table 21 shows 14 or 42.4% have earned a Bachelor's degree; 21 or 63.6% of participants are working on their Master's degree or have earned it; 2 or 6.1% have completed or are currently working on their Educational Specialist degree; and 0 or 0% have completed on or are working on a Doctoral degree.

Table 21

Current Degree Type or Most Recent Degree.

		Frequency	Percent
Valid	Bachelor's	12	36.4
	Master's/EdS	21	63.6
	Total	33	100.0

Survey question #35 asked if the participants had any related industry work experience. Table 22 shows 21 or 63.6% of participants that have related certified work experience; 7 or 21.2% of participants that have voluntary work experience; and 5 or 15.2% of participants that have no related work experience.

Table 22

Extent to Which Participants Have Related Work Experience.

		Frequency	Percent
Valid	yes, certified	21	63.6
	yes, voluntary	7	21.2
	no	5	15.2
	Total	33	100.0

Survey question #36 asked if the participants held an occupational certification. Table 23 shows 14 or 42.4% of participants hold an occupational certification; more specifically, 8 or 24.2% of participants hold an industry certification; 6 or 18.2% hold an alternative certificate or license; and 19 or 57.6% have no additional certification experience.

Table 23

Extent to Which Participants Hold an Occupational Certification.

		Frequency	Percent
Valid	industry/alternative	14	42.4
	no certification	19	57.6
	Total	33	100.0

Chapter V

Summary, Conclusions, and Recommendations

This chapter reviews the study, discusses the conclusions based on the research objectives, and presents recommendations based on the research findings.

Summary

The purpose of this research was to establish professional opinions, uncover guiding principles, and make recommendations for Gateway Technical College administration regarding the alignment between secondary technology education programs and Gateway Technical College's Manufacturing and Engineering occupational programs. Upon completion of a review of the literature, a survey was developed, reviewed by the field study committee and sent to seventy-three secondary technical education teachers within the Gateway Technical College District.

The purpose of the survey was to acquire information, evaluate opinions, and measure current perceptions and expectations of secondary technology teachers and determine differences in individual perceptions based on experience and demographics. It is important for Gateway administration to understand the perceptions of secondary technology education teachers with regard to providing appropriate services to them and ultimately to students transitioning from secondary to post secondary programs.

Service quality is one of the measures used to apply customer satisfaction theory (Parasuraman, Berry, and Zeithand, 1985). Gateway is currently vested in Noel Levitz customer service orientation. Quality service can be defined as a judgment about overall excellence of service that contributes to an outcome or development of an attitude.

Faculty perceptions are cognitively based, formed by mental comparisons of gaps on performance or service (Leach & Liu, 2001). Personality factors of perception allow different individuals to respond differently to stimuli based on knowledge patterns, interests, needs, and values (Schiff, 1980). Opinions are difficult to quantify because they are based on individual perceptions or judgments. Evidence suggest that overall professional experience is important and significant when evaluating quality in education (Falkner, 2005).

Professional opinions of secondary technology education teachers toward the alignment of Gateway's Manufacturing and engineering program were explored by examining factors that impact participants' beliefs and practices. Returned surveys were documented and data collected and analyzed using SurveyMonkey software. A report of frequency counts and percentages for each question was generated. Information collected was analyzed to determine if there was statistical significance of the perceptions of the participants.

Limitations

This study has the following limitations:

1. Generalization of responses: opinions expressed by respondents cannot be generalized to secondary technology education teachers across the State of Wisconsin. Results of this research must be confined to only the technology education teachers within the Gateway Technical College District.
2. Due to the nature of this study, participants' risks seem minimal. There would be no physical, economic, or legal risk associated with this research. Minimal risk is defined by the U.S. Department of Health and

Human Services (2001) as "The probability of magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examination or tests." Participants will be kept anonymous to protect from public exposure.

3. The psychological risk while minimal may result in the possibility of altered self-concept, increased anxiety or loss of confidence in other or government systems due to the nature of the subject matter and the interview. The web-based survey will be designed to be open-ended and may draw upon emotional experience that could not be perceived at the time of the survey. It is possible that past negative experiences "may re-evoke painful memories or emotional conflicts for participants both during and after the interview" (Hadjistavropoulos & Smith, 2001. p.167). In order to protect against these potential risks, participants should "have ample opportunity to withdraw so they can protect themselves" and "feel completely free to terminate participation at any time and for any reason" (Sieber, 2000, p.16). It is also important to debrief at the conclusion of the interview, sharing with the participants "appropriate reassurance and information about normal reactions" (Eyde, 2000, p.63). Rosenblatt (1999) declares that there is nothing more important to protecting the participants form psychological risks than a sensitive researcher who looks for cues of discomfort and is willing to change the direction or even end the interview if too much harm seems to be taking place.

4. The written interpretation of the participant's experience may provoke and emotional response from the participant if the resources in the vein the participant do not represent his experience believes in appropriate (Hadjistavropoulos & Smythe, 2001). In the cause of this study, the risk will be minimized through briefing sessions for participants describing the purpose, procedure, expected outcome, and behavioral risks.
5. While this survey does not appear to have any direct social risk, it is important to recognize that there may be interchange between the participants and the researcher. For this reason, it is critical to insure individual confidentiality. The risks can be minimized through the development of a consent form in which participants were made aware of risks and assured that their individual identity nor the relationship will not be jeopardized in any way.

Conclusion

There were six research objectives addressed by this study. Each of the six objectives will be restated and conclusions made for each. While not every finding resulted in a specific recommendation, the study provided a comprehensive review of the philosophical relationships between secondary and technology education programs and Gateway Technical College's postsecondary programming.

Research Question #1: Determine the individual perception of the role of secondary technology education teachers in technical college programming.

The study provided insight to the individual perceptions of the role of secondary technology education teachers in technical college programming in several ways.

Questions #2, #18, #20, #22, #24, #27, and #30 each provided a contextual rating to assess the perception of the individual teacher's role in technology college programming.

Ninety-seven percent of secondary technology educators responding to the survey reported that they believe technology educators provide direction and 94% believe technology education supports skill development.

Further review indicated that while 88% of secondary technology education teachers believe they are adequately prepared to teach technology education, the data also demonstrated an equal split of 18.2% each at levels 6, 7, 8, 9 and 15.2% at a level 10. This indicates that there is not overwhelming belief that secondary technology teachers have the confidence that they were highly proficient in their preparation to teach technology education.

Survey results in question #26 also indicate that there is a need for continued investigation in the alignment between technology education and engineering education. While the response to the survey question indicates a solid rating of 7 on the 10 point scale. The responses follow a bell curve from a rating of 3 to 10. In reviewing the open ended comments, 18 of the recorded 83 comments specifically mention engineering and/or Project Lead The Way, a high school engineering curriculum.

Evaluation of the individual perceptions of the role of secondary technology education teachers in technical college programming have led the research to recommend Gateway Technical College establish professional development opportunities for all secondary technology education teachers. This experience will foster a greater understanding of the educational content, occupational focus, and instructional delivery methods of Gateway Technical College instruction.

Research Question #2: Identify current perceptions of technology education philosophy.

The identification of current perceptions of technology education philosophy is important to understanding the potential alignment of secondary and postsecondary programs. Evidence provided in questions #6, #12, #14, #16, #26, and #30 reveals that 31 of the 33 respondents believe that secondary technology education should be aligned with technical college programming. Further, 29 respondents out of 32 support technology education being taught in a 11-14 grade sequence.

As referenced in the previous research objective discussion, the alignment of programs such as Project Lead The Way (PLTW) may serve as a model for successful 11-14 alignment. Gateway Technical College actively supports the PLTW program offerings at the secondary level and recognizes all PLTW credits as direct program transfer credit.

Research Question #3: Determine the level of emotional feeling toward 11-14 grade sequencing.

This research objective was evidenced extensively in the open ended comments as participants expressed the desire to sequence programs. One participant suggested, "Why stop at grade 14." Research questions #4, #6, and #14 were designed to draw out the

emotional feelings toward 11-14 grade sequencing. A closer look at question #14 shows that 29 of 32 respondents support 11-14 grade sequencing at a level of 6 or higher with 22 at a level of 8, 9, or 10. The evidence is clear that there is emotional support for 11-14 grade sequencing.

Research Question #4: Measure the level of support for Gateway Technical College by secondary technology education teachers.

As with any change initiative, building strong relationships grounded in understanding and trust is critical to sustaining the change. This research objective is designed to measure the level of support for Gateway Technical College through questions #12, #22, and #24, starting with the support for alignment of technology education with technical college programming. Question #12 reveals 31 out of 33 respondents support the alignment of programs. Question #22 defines alignment in terms of credit transfer. The analysis shows that 28 of 32 respondents believe postsecondary credits enhance high school programming. Program credit alignment appears to have greater support than Wisconsin Youth Options course options. From the open ended question responses, there appears to be concern by the respondents to ensure a balance of academic courses and technology education courses in high school. This feeling of competition between academic achievement and technical skill development can have an impact on the level of support secondary teachers have for Gateway Technical College based on the academic requirements of Gateway.

Research Question #5: Identify current perceptions of program alignment. Evidence of current perceptions of program alignment was best described in questions #20, #26, #28, and #30. Responses to these questions demonstrate that secondary technology education teachers have a positive perception toward the importance of

program alignment. Approximately 88% scored a 6 or higher when asked to what extent do articulated courses increase the recognition of technology education. This response rate indicates that there is a perceived value to high school courses receiving postsecondary credit. While there is strong belief by secondary technology education teachers that they understand the opportunities for postsecondary articulation, only 1 or 3% of the respondents indicated they understood these opportunities to a great extent. Most fell in the 7 range.

The Gateway Technical College administration should establish a district-wide policy on transcripted articulation and credit transfer from secondary to postsecondary programs.

Research Question #6: Determine if there are differences in individual perceptions based on demographics. Review of the data to support this objective includes responses to questions 32, 33, 34, 35 and 36. Analysis of the data indicates that there is a distinct correlation between age, degree achieved, and occupational certification, but not a significant degree of variance in gender or related work experience.

Of all the respondents to question 33 on gender, only three were female. Therefore, there was not enough data to draw conclusions based on gender. Question 35 asked about related work experience. Upon review of the question and corresponding responses, it was determined that the question may not have been clearly stated. Data corresponding to question 35 indicated that 63.6% of respondents have certified work experience while in question 36 asking if respondents had occupational certification, only 19 of 33 responded positively. The research objective is closer aligned with occupational certification. Therefore data analysis for question 36 and not question 35 was used in the overall demographic analysis.

Review of questions 32, 34 and 36 indicates a direct correlation in three areas. First, age demographics data shows that there is a change in the respondents' support for the alignment of secondary technology education and technical college programming as age increases. While a question regarding experience was not asked, the analysis equates the increase in age with years of experience. The age category of 22-36 shows a balance of responses throughout the scale, while category 37-50, and specifically 51-62, indicates a strong belief that alignment between secondary and postsecondary programming is important.

Responses to these questions indicate a greater level of support for 11-14 curriculum alignment for technology teachers in age categories 37-50 and 51-62.

Results of the survey show that respondents with industry certification have a stronger belief in the alignment between secondary and postsecondary programming. The research identified that 87.5% of teachers holding an industry certification believe to a great extent 9 or 10 compared to 36.8% of teachers without occupational certification.

The results of this study indicate that there is a strong correlation between teaching experience and the beliefs that secondary technology education teachers hold toward the alignment of secondary and postsecondary programming. Likewise, secondary teachers with industry experience and occupational certification hold a much greater philosophical belief that 11-14 grade sequencing is valuable. The researcher recommends continued study with postsecondary instructors to see if the beliefs and philosophy of postsecondary instructors have similar philosophical trends.

The following is a descriptive list of five recommendations that was drawn from the study results. Recommendations 1, 2, 3 and 4 each have sub-recommendations that support the success of the overall recommendations. It is the opinion of the researcher

that Gateway has the strong base of interest and programming to fully implement the recommendations.

Recommendations for Gateway Technical College Administration

1) Establish professional development opportunities for all secondary technology education teachers in areas of manufacturing and engineering.
    a. Provide a new teacher orientation to Gateway for all new secondary education teachers.
    b. Provide a mentoring opportunity for manufacturing and engineering and secondary technology education teachers.
2) Establish a transcripted credit agreement for all secondary schools offering Project Lead The Way courses.
    a. Host instructor training opportunities through Gateway Technical College.
    b. Establish engineering 2+2+2 programs that focus on Project Lead the Way credit transfer.
3) Study the possibility of establishing a secondary/postsecondary 11-14 manufacturing career academy in Racine County.
    a. Provide K-12 technology education teachers with certification experiences that include technical college curriculum alignment and industry experience.
4) Develop a system of reporting back postsecondary student achievement to local high schools districts.
    a. Establish uniform high school graduate reporting data.
    b. Include data reporting in Gateway's annual counselors training workshop.

5) Develop a district-wide policy on transcripted credit transfer for secondary school articulation.

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APPENDIX A
Research Objectives Addressed in Instrument

Research Objective	Instrument Item
1) Determine the individual perception of the role of secondary technology education teachers in technical college programming.	#2, #18, #20, #22, #24, #28, #30
2) Identify current perceptions of technology education philosophy.	#6, #12, #14, #16, #26, #30
3) Determine the level of emotional feeling toward 11-14 grade sequencing.	#4, #6, #14
4) Measure the level of support for Gateway Technical College by secondary technology education teachers.	#12, #22, #24
5) Identify current perceptions of program alignment.	#20, #26, #28, #30
6) Determine if there are differences in individual perceptions based on demographics.	#32, #33, #34, #35, #36

APPENDIX B
Survey instrument

The purpose of this study is to analyze the alignment of secondary technology education with math and science and with technical college programs. Your responses to this survey are anonymous. Thank you for your time and input.

1. Your participation in this research study will remain confidential and be kept secure by the researcher and protected by the University of Wisconsin-Stout Institutional Review Board requirements. By checking the consent box below, you are voluntarily agreeing to serve as a research subject.
2. To what extent is technology education valued by your district?
3. Comments.
4. To what degree does technology education support academic achievement?
5. Comments.
6. To what extent does technology education provide career direction?
7. Comments.
8. To what extent does technology education teach skills development?
9. Comments.
10. To what extent does technology education support problem-solving skills?
11. Comments.
12. To what extent should technology education be aligned with technical college programming?
13. Comments.
14. To what extent would you support technology education being taught in an 11-14 grade sequence?
15. Comments.
16. To what extent should technology education be competency-based education?
17. Comments.
18. To what extent do you believe you were adequately prepared to teach technology education?
19. Comments.
20. To what extent do you believe you understand the opportunities for postsecondary articulation in technology education?
21. Comments.
22. To what extent do postsecondary credits enhance high school programming?
23. Comments.
24. To what extent are "Youth Options" courses viable technology education courses?
25. Comments.
26. To what extent does technology education align with engineering technology?
27. Comments.
28. To what extent do articulated courses increase the recognition of technology education?
29. Comments.
30. To what extent is teacher certification a factor in secondary and postsecondary alignment?
31. Comments.
32. What is your age?

33. What is your gender?
34. What is your highest level of educational attainment?
35. Do you have related industry work experience?
36. Do you currently hold an occupational certification?

APPENDIX C
Consent to Participate in University of Wisconsin-Stout IRB Approved Research

Bryan D. Albrecht
4018 Terrace Park Court
DeForest, WI 53532

October 16, 2007

Dr. Susan Foxwell, Chair
UW-Stout Institutional Review Board
152 Vocational Rehabilitation Building
UW-Stout
Menomonie, WI 53751

Dear Sue,

It is with great pleasure that I submit to you the enclosed survey designed to support my field research titled, "An Analysis of Southeast Wisconsin's Secondary Technology Education Teachers Perceptions on Aligning Technology Education Programs with Gateway Technical College's Manufacturing and Engineering Occupational Programs."

I have developed my research and survey under the guidance of my faculty advisor, Dr. Howard Lee. I have attached Chapter III describing my research methodology as well as the survey cover letter and participant survey. All participants will be required to check the approved consent box prior to completing the survey.

If there is any additional information you might require, I can be reached at albrechtb@gtc.edu or 262.564.3610.

Sincerely,

Bryan D. Albrecht

enclosures

Research Services
152 Voc Rehab Building

STOUT
UNIVERSITY OF WISCONSIN

University of Wisconsin-Stout
P.O. Box 790
Menomonie, WI 54751-0790

715/232-1126
715/232-1749 (fax)
http://www.uwstout.edu/rs/

Date: May 7, 2008

To: **Bryan Albrecht**

Cc: **Howard Lee**

From: Sue Foxwell, Research Administrator and Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research (IRB)

Subject: **Protection of Human Subjects**

Your project, "**An Analysis of Southeast Wisconsin's Secondary Technology Education Teachers' Perceptions on Aligning Technology Education Programs with Gateway Technical College's Manufacturing and Engineering Occupational Programs**," has been approved by the IRB through the expedited review process. The measures you have taken to protect human subjects are adequate to protect everyone involved, including subjects and researchers.

Please copy and paste the following message to the top of your survey form before dissemination:

> **This research has been approved by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46.**

This project is approved through December 3, 2008. Modifications to this approved protocol need to be approved by the IRB. Research not completed by this date must be submitted again outlining changes, expansions, etc. Federal guidelines require annual review and approval by the IRB.

Thank you for your cooperation with the IRB and best wishes with your project.

***NOTE: This is the only notice you will receive – no paper copy will be sent.**

APPENDIX D
Survey cover letter (electronic)

Albrecht, Bryan

Dear

My name is Bryan Albrecht, president of Gateway Technical College. I am currently completing my Education Specialist Degree through the University of Wisconsin-Stout. As a part of my degree, I am conducting a survey of secondary technology education teachers within the Gateway Technical College District. I would appreciate your assistance in completing the ten minute survey at the link below by October 24, 2007.

The purpose of the study is to establish professional opinions, uncover guiding principles, and make recommendations for Gateway Technical College's administration regarding the alignment between secondary technology education programs and Gateway Technical College's Manufacturing and Engineering occupational program. The information will remain confidential, and you have the right not to participate or withdraw from participation at any time during the study. By completing the survey, you are giving informed consent as a participating volunteer in the study.

Results of the study will not contain personal identification of any of the participants. Questions or concerns about participation in the research should be addressed to my research advisor, Dr. Howard Lee at leeh@uwstout.edu.

Thank you for your assistance and support. I look forward to your response.

http://www.surveymonkey.com/s.aspx?sm=q1vB63w7QqeCFG7A9fwGCQ_3d_3d

Sincerely,

Bryan

Bryan D. Albrecht
President
Gateway Technical College
3520 - 30th Ave
Kenosha, WI 53144
262-564-3000 fax 262-564-3001
albrechtb@gtc.edu

APPENDIX E
Survey Questions – Comments

Comments following Question #2 – To what extent is technology education valued by your district?

1. I am not sure if your reference to Technology Education (TE) is separate or inclusive of Vocational Education (VE). We do not have a TE program, but we do have a VE program. For the purpose of this survey, I will respond to TE as if it were inclusive of VE.
2. More by the Supt than the Principal
3. Project Lead The Way and Technology Classroom have received and committed over 250K in the last year alone. The Auto labs at both Tremper and Bradford HS in Kenosha have received a total make-over; expanded walls and classroom, New PC's, Epoxy floors, 2-new lifts and several complete new sets of Snap-on tools. My CAD lab and 3-additional labs have new PC and LCD screens.
4. classes are offered, but they are the first to be cut. Career electives are often considered as unnecessary.
5. This is a rather low six however The district is making a move toward excepting Tech Ed as a valuable course of study
6. With the exception of the Project Lead The Way courses that were implemented recently and the new Auto up-grades. The Technology Ed. Curriculum has not changed nor has it's facilites (sic) since Technology Ed. was started in the 1980's. I understand that all the school districts are strapped for money but I feel the district would rather just have liberal arts courses in High School. With the school of 2500 students Bradford & Tremper high school should have a staff 3 times its size. When I started in 1974 we had 8-9 teachers in each high

school and 2-3 teachers in each Jr. High. Now some middle schools have NO Technology Ed and the High Schools have only 3-4 teachers.

7. It is the wave of the future for the job market. Also, it enables the work force to continue to educate and advance their skill-work level.

Comments following Question #4 – To what degree does technology education support academic achievement?

1. We put application to the theories they teach
2. In PLTW classes, the honor's level and math and science classes work together to assist students with engineering problems and labs.
3. This question can be looked at by two sides. I feel that Technology Ed. would greatly support academic acheivement (sic) BUT, if the district thought it would, Technology Ed. would be required of every student for graduation. So are you asking how I feel or the direction of the District. Every Middle School student was required to take Technology Ed. NOT ANY MORE!!!!
4. It will assist students to move forward into the study of engineering and tech ed continue raise the standards of our tech programs.

Comments following Question #6 – Extent to which technology education provides career direction.

1. We need to improve our program in this area.
2. We discuss career opportunities in all of our units
3. Maybe our school (Lakeview Technology Academy) is one of a handful in the state that stresses a required field trip each semester to visit local area business for the express intent to foster positive view of community unity (K.A.B.A. - Kenosha Area Business Association) and increase future employment interest with our students.
4. it is pushed in class by instructors and speakers
5. Technology Ed. does provide career direction. BUT, ask any parent and they want their child to go to College. Gateway even changed it's name to a Gateway Technical College. Can a teacher obtain credit for classes taken from Gateway for license renewal in the state of Wisconsin?? Our image some how has been tarnished and I hope PLTW will help change that.
6. It gives students a stronger direction on their career outlook in the future. Knowing that tech ed-engineering at both the high schools and the technical colleges can give them that. Having technical advance course work in high school can help out the door for students to enroll at their local tech college.

Comments following Question #8 – Extent to Which Technology Education Teaches Skill Development.

1. When we have the lab facilities, and through the student organization activities
2. I teach PLTW courses such as: Introduction to Engineering Design,(I.E.D.); Principles of Engineering,(P.O.E.); Digital Electronic,(D.E.); AutoCAD, Inventor, a 3D Solid-Works program, Fundamental of Machining, and Tech Systems-1. All of these courses have inherent hands-on skills that teach, model and employ either basic maching (sic) skills involving the metal-lathe, milling machine, drill-press, grinder or software that integrates CAD/solidworks principles that incorporates orthographic, isometric and parametric models as well as animation of 3-D puzzle cubes, and required reseached (sic) projects. My students will positively and proficiently demonstrate their learned skills to anyone at any given time concerning their learned skills.
3. I think we need to have more courses that are connected like in the 70's. When we changed to Tech Ed. in the 80's our curriculum was an overview of every thing with no connection to anything. Having courses that are more connected allows the student to build those skills each year they are in school. Kids took pride in the projects they took home to mom. Not many students take home projects made with popsicle (sic) sticks and hot glue.
4. From the lower level skills to the advance level skills. Student enroll in tech ed from basic to advance have a higher confidence attitude about earning a living by having taken a tech ed class. USING THESE TECHNICAL TRADE ADVANCE SKILLS FOR LIFE.

Comments following Question #10 – Extent to Which Technology Education Supports Problem-Solving Skills.

1. I recently finished my plan B research paper thru U.W.-Stout, for which I tested students' general reasoning skills before and after participation in cabinetmaking classes. My research showed an improvement in students' reasoning skills as a result of participation in these classes.
2. Again putting application to the theories
3. In AutoCAD, students are given multiple problems to solve. I.E. designing gaskets from an orthographic presentation. Creating ISO views from either ortho or auxiliary views and visa-versa. In PLTW, students are given several opportunities to design, test and improve lab work in multiple areas such as an Egg-Drop box. A box that is literally dropped from the roof of our school with 2-raw eggs. Additionally, students are required to research, design and build a desktop organizer, and/or invent-innovate a new or existing product as a Final Project.
4. Technology Ed. is all about problem solving. Imagine how successful PLTW could be in High Schools if Middle schools and Grade schools had Technology Ed.
5. It helps give a quty finisih (sic) product it best look. example: Automotive Design, Home Building Design and Mech. Parts Design

Comments following Question #12 – Extent to Which Technology Education Should be Aligned with Technical College Programming.

1. Local tech colleges do not offer all aspects such as Gateway and Animal Science or Natural Resources

2. Here at Lakeview, we already have integrated an articulated agreement with Gateway Technical College. Gateway in-turn has articulated an agreement with Marquette UNV. Last spring to use Gateways 2-year program to fully transfer students into their 4-year engineering programs. Personally, I believe all technology education programs should be aligned with our technical colleges. Bottom line: if we do not, were only hurting our own students and our future. (Otherwise, hello China- here's more of our industry you can take advantage of...).

3. I feel it should be connected from Grade schools through the Technical College. Bring Science, Math and maybe English departments together with Technology ED. The curriculum must be connected with a direction and purpose. If we don't change very soon the 250 million Chinese that are will take over all manufacturing and engineering, leaving the U.S. with only service jobs and maybe many of them will be done in china (sic) and up-grades will happen over the internet.

4. I am a new teacher and new to the area. I would like to know what the area Technical College would like out of my students. What do your instructors feel we should be improving on? Is there anything that I'm not teaching that they would like me to? I'd ideally like the Gateway instructors to start the first day on new material without having to get everyone caught up.

5. Teachers, Administration and Parent should be on the same educational page with this

development. Students should have enroll (sic) in basic and advance level tech ed classes while in high school. This help assist the success in a tech college.

Comments following Question #14 – Support for Technology Education Being Taught in an 11-14 Grade Sequence.

1. Kids should know their opportunities
2. If by 11-14 grade sequence you are implying students at the high school level would use their secondary level courses to articulate into/with post secondary level training my answer would be yes. If however, tech-ed (secondary type) courses are taught at the technical college level I'm not sure if students at the post secondary level would be exploring avenue's of careers fields or expounding/broadening their level of knowledge for attaining new skills, unless they are re-training to new career field. As I see it, we are helping our 11-12 students explore and sample new skills and broadening their awareness along with teaching new (basic)skills. If grades 13-14 are articulated from grades 11 and 12 into a technical college then I'm all-for-it!
3. only if 9-11 was continued as it is presently and not as an achademic (sic) only, save the 11-14 when all else has failed
4. I think it should be a 9 - 14 grade sequence
5. I have no problem with a heavy concentration of any Technology Ed. program in 11-14. But, We need to teach Basic Skills in at least the Middle Schools as well. In Jr. High I learned how to Draw, Measure, Sand, Finish, Drill, Nail, Screw and understand the basics of hand tools etc. Many of my students in the High School have never experienced these skills of tasks. Hence to have a curriculum in Manufacturing expecting students to have acquired these skills will only make achievement more difficult.

6. I'm not sure. I'd have to see the urriculum (sic) before I'd feel comfortable giving an answer. I would definitely be willing to consider it though.

7. I don't believe Technology Education should replace what the technical college systems are doing nor do I believe the technical college system can replace what Technology Education at the High School level is doing. They should compliment each other, but not duplicate each other.

8. Highly, by taking college course work at my local technical college myself. This will help me teach both basic and advance (sic) tech ed drafting course work to my students.

9. Why stop at grade "14"? To me, Technical Education begins at elementary school and continues as long as we live in this society.

Comments following Question #16 – Extent to Which Technology Education Should Be Competency Based.

1. I am unsure as how is this comparing to the standards base which we are being asked to crosswalk with science math and English
2. What's the point of teaching and training skills or skill-sets without standards. Students must have attainable levels of standards or else we are all going to miss the mark.
3. I think all of education should be competency -based. I also think students should be tracked. Don't require competency in Calculus if that skill is not required. I know many plumbers making over 100K a year and the only math they needed was maybe algebra and Geometry. The Geometry could probably be taught using AutoCad without knowing all the definitions and theorems. But, If Engineering is the track Calculus is a must.
4. Technology Education by its nature is application oriented and therefore lends itself to be very competency-based. I don't see why you would want to teach it any other way.
5. Always hand-on with test, and quiz

Comments following Question #18 – Extent to Which Participants Believe They Were Adequately Prepared to Teach Technology Education.

1. I graduated from U.W.-Stout in 1976, and received outstanding training in Vocational Education. Many students graduating from U.W.-Stout now have good training in Technology Education, but poor training in Vocational Education.
2. Although I have a broad based base of knowledge in many different areas (i.e. Auto-to-Welding) my personal depth of knowledge in certain skills like AutoCAD or 3-D solidworks was not. However, having the basics greatly assisted me in developing and honing additional skills required in seeking an in-depth level through further training such as; PLTW summer academy training and seminars in the Technology-ed arena.
3. I had 20 years in private industry in between my teaching careers.
4. Good question. I recieved (sic) my Electronics assoc. degree from the Tech school in Oshkosh. Transferred to Stout. To my surprise Electronics was in Industrial Arts and not part of Science. I graduated with concentrations in Electronics, Physics and Computer Programming with an Education Major. With that background I feel I was well prepared. I'm not so sure of the new Students coming out of college these days. There majors are so filled with liberal arts courses that there is very little concentration in any one subject. There are to many hoops that the new teacher has to go through. The requirements for a mastery license is nonsense. Lets go back to mastery in machine shop or mastery in the trades such as an Electrical, Plumber etc. The State needs to Pay this teacher the equivalent for obtaining such mastery. Then we may adequately prepare both the students they teach and the student teacher.
5. I came to education rather late I worked as a carpenter for 28 years before entering the

teaching profession

6. Thirty years ago, UW-Stout prepared me very well for both the methods of teaching as well as the technical skills required for content knowledge in many different areas. Over the years I have seen many new instructors come out of UW-Stout with method knowledge but lacking technical skill. I believe this loss is due to Stouts curriculum changes and tunnel vision into the high-tech arena.

7. With on the job training in Commercial Construction and a tech ed 220 lec and along with 3 capstone trade lec.

8. I attended Stout during the time Industrial Arts was making the transition to Technology Education. I feel I learned more about the "shop" aspect from my high school woods, metals, and drafting than I did from Stout.

9. I was prepared in 1972--it certainly was "adequate" at the time; as time and change have dictated, I have tried to keep up with the times.

Comments following Question #20 – Extent to Which Participants Believe They Understand Post Secondary Articulation Opportunities.

1. More now, than when attending school either at the undergraduate or graduate level. I knew about articulation as far as what it is and how it works. But, may not have completely understood the process and opportunities existed in our state and local school districts. It would have been nice to have a school district/college representative explain how it would apply for s specific vocational area.
2. Fairly well
3. I feel I am somewhat informed since I do teach PLTW courses. Looking at what content a PLTW course may have and the rigor that a full fledged college course may require may be vastly different. I do feel that we need to have more courses like PLTW way that interface in a 11-14 education.
4. The outlook is great for those who have worked hard and understand and the strong value and history industrial ed and tech ed.
5. Do you mean that the Technical Colleges want to duplicate what the High Schools do?

Comments following Question #22 – Extent to Which Participants Believe Post Secondary Credits Enhance High School programming.

1. For those who are college bound, it is significant. However, for those who are not yet ready or mature enough to tackle a specific voation (sic) it would be frustrating.
2. I am unsure of the number of kids that utilize the opportunities as we get no feed back
3. The postsecondary credits are only as good as the courses the student takes. There are some concepts that I do not teach my sophomores and Juniors in C++ that he/she may be taught in a college course. Most are not mature enough to handle the concepts. Although my students will have a very good background in the language.
4. It help promote a college scholarship and help them enroll into a tech ed or engineering program.
5. More than anything, I think they foster a climate of "greed" and "double-dipping" i.e. for some students getting something for nothing, when they would be better served by staying in high school instead of exercising their post-secondary options.

Comments following Question #24 - Extent to Which Participants Believe Youth Option Courses are viable technology education courses.

1. For those who are college bound, it is significant. However, for those who are not yet ready or mature enough to tackle a specific voation it would be frustrating.
2. I am unsure of the number of kids that utilize the opportunities as we get no feed back
3. The postsecondary credits are only as good as the courses the student takes. There are some concepts that I do not teach my sophomores and Juniors in C++ that he/she may be taught in a college course. Most are not mature enough to handle the concepts. Although my students will have a very good backgroung in the language.
4. It help promote a college scholarship and help them enroll into a tech ed or engineering program.
5. More than anything, I think they foster a climate of "greed" and "double-dipping" i.e. for some students getting something for nothing, when they would be better served by staying in high school instead of exercising their post-secondary options.

Comments following Question #26 - Extent to Which Participants Believe Technology Education Aligns with Engineering Technology.

1. In the hands-on and PLTW courses it aligns very well. With some courses (i.e. woods, graphics, and basic tech-ed classes-nnot so well.
2. We have PLTW engineering in but I doubt there is much education of the students as to applications in ag and other fields
3. With PLTW I feel it does. Which goes back to tracking. Why would any counsler place 8 SPECIAL ED students in a Digital Electronics class?? Well one did with me. The answer is : " Well there was an opening in the class and it is a Tech class so I saw no problem with it. We need to educate many people that Technology Ed. is part of Engineering Technology. Not just a place to put students if they don't fit in the other educational streams.
4. Again, educational foundation that helps kick start them into the field of engineering.
5. I think that High School Drafting--Descriptive Geometry and course work akin to Drafting, align closest to an Engineering Curriculum.

Comments following Question #28 - Extent to Which Participants Believe Articulated Courses Increase the Recognition of Technology Education.

1. Its speaks very well for itself, nuff (sic) said.
2. I feel it is to early to know. We need to have more awearness (sic) with bothe (sic) parents and staff.
3. It promote the college bond student into the field of tech ed or engineering studies.

Comments following Question #30 - Extent to Which Participants Believe Teacher Certification is a Factor in Secondary and Post Secondary Alignment.

1. Without a qualified PLTW/Tech-Ed teacher, we might as well not go down that road. We as a body of Technology-Teachers need to develop a strong voice, maintain a command name and pull together as a family to remain strong. We must commit (sic) together as a whole to be fully certified, Master level, and continue our skills and qualifications to be the best at our craft in order to prepare and train for our future generations.
2. They are trying to put science teachers in to teach whatever classes they can
3. it is important, but not always the only thing. I knew a substitute teach (sic) who was a retired aerospace engineer for NASA. He was not able to get certified to teach CAD drafting part-time, even though he had done this for 3o (sic) years.
4. If you talk to students it's not about caeers (sic) to students. It's about money. How much money can I make? I was talking to three seniors at MSOE last summer. They were taking an MRI of a womans (sic) hip and creating a 3-dimentional model. I asked them if they had jobs after leaving MSOE. They all said yes ranging from 58K to 70K. I said that's (sic) very good and that I have taught for over 33 years and have just made 66K. All three students were angry and wished they were pharmacy students stating that they were starting at over 100K. I couldn't believe what I was hearing. How many of these very bright students will seek a career in teaching at 30K?
5. Specifically what certifications?
6. To have qty (sic) tech ed leaders to serve with SKILLSUSA, WTEA, ITEA, and tech at all levels.